

APPENDIX G

Neighborhood Impacts of the Proposed Amendments to the CaRFG3 Regulation

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A. Air Quality Impacts

The CaRFG3 regulations were implemented statewide in 1996. To implement the phase-out of MTBE in gasoline, CaRFG3 regulations were to be implemented by December 31, 2002. With the Governor's directive to delay implementation of the CaRFG3 regulations, staff is proposing to modify the CaRFG3 regulations to be implemented by December 31, 2003.

In California, nearly all of the CaRFG2 consumed is produced by refineries in the South Coast Air Quality Management District (SCAQMD), the Bay Area AQMD (BAAQMD), and the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD). Based on compliance plans submitted by each of the individual refineries, staff expects the same refineries that produce CaRFG2 will also produce CaRFG3.

B. CaRFG3 Refinery, Terminal, and Distribution Modifications

Refiners began shortly after the Board's approval of the CaRFG3 regulations in December of 1999 to develop the plans to make the refinery, terminal, distribution, and transportation modifications necessary to produce CaRFG3 and to transition to the use of ethanol in gasoline. Depending on the existing refinery's process equipment and their approach towards handling ethanol, the modification and construction of some new equipment was required. New construction or modifications of refinery and alkylation units are some of the more common items that were modified to meet CaRFG3 specifications. To blend with ethanol at terminals primarily requires modifications to allow injection of ethanol during loading of delivery tanks.

While there are a number of process modifications that are required to produce CaRFG3 gasoline with ethanol, there are also additional infrastructure needs that must be met due to ethanol's unique properties. For example, gasoline blending components such as ethanol and alkylate must be imported or transported via marine, rail, and truck from sources outside of California. In addition, there is traffic from California to other parts of the state and outside of the state to export rejected gasoline components like pentane, in this case due to the lower RVP base fuel needed to blend with ethanol. Also, as ethanol is not blended with gasoline at the refinery because of its affinity to water, truck and rail traffic is also increased further downstream than at the refinery as the gasoline and ethanol are trucked out to terminals, for blending, and once blended transported to retail stations.

C. CEQA Reviews for CaRFG3 Projects

The refinery modifications for CaRFG3 were subject to requirements to assess both local and regional multimedia environmental impacts (i.e., water, air, waste, toxics, etc.). In regards to emission impacts, the primary environmental requirements were the California Environmental Quality Act (CEQA) reviews, local governmental land use requirements, and local district air permitting requirements.

The CEQA process is used to address and mitigate the local emission impacts of the CaRFG3 refinery modifications. CEQA requires state and local agencies to identify significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. The CaRFG3 projects in the SCAQMD and BAAQMD have been reviewed under CEQA. The CaRFG3 projects in the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) probably will not be subject to CEQA as very minimal changes, if any, are expected.

D. California's Air Permit Requirements for CaRFG3 Projects

California's emission permit programs for new and modified stationary sources are referred to as New Source Review (NSR) programs. NSR programs, adopted by air districts, consist of regulations and requirements that govern the building and expansion of stationary sources. Stationary sources are industrial or commercial facilities which emit air contaminants. Mobile sources, such as trucks and automobiles, are not regulated under NSR programs.

The purpose of NSR is to provide the regulatory mechanism to allow continued industrial growth in non-attainment areas while minimizing the amount of emission increases from this growth. The California Clean Air Act (CCAA) mandates that the purpose of NSR is to keep emission levels from the permitting of new and modified stationary sources at a constant level; in other words, to allow no increase in emissions. Under the NSR program, air districts evaluate the potential emission increases from new and modified stationary sources. If emission increases are above specified levels, the district requires the source to apply best available control technology (BACT) to control those emissions.

After BACT is applied, the project's remaining emission levels are then compared to another specified level called the offset threshold. Offsets are required to mitigate any emission increases remaining after BACT has been applied. These offset requirements are usually at a ratio greater than one (e.g., a 100 pound per day emissions increase may have to be offset by 110 pounds of emission reductions). Offsets are emission reductions at the project location or at a nearby location used to compensate for the expected increase in emissions from the project. When a source reduces its emissions, beyond what is required under NSR, it can receive credit for those reductions, called emission reduction credits (or ERC's) which can be sold at a future date or used by the facility to offset future projects. The vast majority of CaRFG3 projects obtained the necessary offsets by achieving on-site emission reductions at their facilities through applying advanced control technologies.

The BAAQMD did not allow an offset exemption in their district for the CaRFG3 projects. As a result, except for carbon monoxide, refineries in the BAAQMD offset all of the criteria pollutant emissions associated with their CaRFG3 projects. The SCAQMD, however, chose to exempt new and modified CaRFG3 stationary source projects from their district offset requirements. The CaRFG3 projects in the SCAQMD were provided with offset exemptions when the associated emission increases were the result of complying with federal, state, or local air quality mandates - in this case the state's mandated CaRFG3 regulations. The Federal Clean Air Act Amendments of 1990 (Section 182(e)(2)) provides state and local agencies in extreme ozone non-attainment areas with the authority to exempt projects from offset requirements for emission increases resulting from compliance with federal, state, and local air quality mandates. This

provision provided specific authority to the SCAQMD, a federal extreme ozone non-attainment area, to exempt CaRFG3 refinery modifications from their offset requirements.

E. CaRFG3 Emissions Impacts

Since its implementation, the CaRFG2 program has provided significant reductions in ozone and particulate matter precursor emissions and toxic air pollutants. The emission benefits of this program have been equivalent to the removal of about 3.5 million vehicles from California's roads, and are a major component of California's plan for achieving both the federal and state ambient air quality standards. The emission reductions from CaRFG2 represent about one quarter of the emission reductions committed to in the 1996 State Implementation Plan. Table 1 shows the criteria pollutant emission benefits of both the CaRFG2 and CaRFG3 programs in the SCAQMD, BAAQMD, and the SJVUAPCD (i.e., areas in the California where refineries produce CaRFG2 and are expected to produce CaRFG3).

In order to produce CaRFG2, California refineries underwent significant modifications from 1992-1998 spending about 4 billion dollars on capital equipment. In order to produce CaRFG3, staff expects that refineries will spend about 500 million dollars (about one tenth of the CaRFG2 expenditures) on capital equipment for refinery and terminal modifications. Modifications for both CaRFG2 and CaRFG3 have included retooling of existing equipment and processes, as well as installation of new equipment. In performing these modifications, the permitted emissions from the refineries have changed. In some instances, these changes resulted in some increases in permitted emissions. In other cases, the change was a reduction in permitted emissions. The change in overall statewide permitted emissions from refineries as a result of the CaRFG2 and CaRFG3 modifications were small. The CaRFG3 projects were subject to California Environmental Quality Act (CEQA) and air district permit requirements and the CaRFG3 associated emissions were mitigated to the extent feasible. In the context of the overall CaRFG2 and CaRFG3 programs, any increases in permitted emissions from refineries were greatly overshadowed by the emission benefits of both the CaRFG2 and CaRFG3 programs.

Table 1 shows the changes in emissions within each of the three air districts as a result of implementing the CaRFG2 and CaRFG3 modifications. The changes in emissions include both changes in permitted emissions from the refineries (known as stationary source emission impacts) and changes in emissions from truck, marine, and employee traffic (known as indirect source emission impacts). As can be seen in Table 1, when the emission impacts of the CaRFG2 and CaRFG3 modifications are compared to the emission benefits of the CaRFG2 and CaRFG3 programs in each of the three districts, the CaRFG2 program emission benefits are on the order of 5 to 400 times greater than any increases in emissions.

Based on staff's assessment of the ARB emission inventory over the years 1990 through 1999, emissions of most pollutants from refineries within these three districts decreased on the order of 20 to 60 percent, depending on the pollutant. It is important to note that the period of time considered by staff is inclusive of the implementation of the CaRFG2 program, and the overall reductions in the emission inventory include the emission impacts associated with the significant modifications undertaken to produce CaRFG2. Continued implementation of air district refinery control measures will continue to reduce emissions from refineries.

The production of CaRFG2 necessitated changes in the movement of materials and components to produce CaRFG2. Changes in emissions from these sources, known as indirect sources, are generally mobile source related and include changes in marine, rail, truck, and employee traffic. There will be similar changes in emissions for indirect sources related to the CaRFG3 projects. There is also an expected increase for indirect sources associated with the CaRFG3 projects primarily in the SCAQMD.

For the CaRFG3 program, most of the indirect source emissions will occur in the SCAQMD and are due to expected increases in marine traffic related to the importation of ethanol, alkylate, and other gasoline blending components and the exportation of rejected pentane stocks. In addition, there will be emission impacts due to increased rail traffic to import ethanol from the Midwest. There will also be additional truck traffic primarily related to moving ethanol from hubs to gasoline distribution terminals for blending into gasoline. For CaRFG3 projects, there were approximately a 3 tpd and 1 ½ tpd emission increases for NO_x and SO_x, respectively, in the SCAQMD related to ship, rail, and truck traffic to import and distribute ethanol, alkylate, and other gasoline blending components.

As previously discussed, while there were emission impacts associated with the implementation of both the CaRFG2 and CaRFG3 programs, these impacts are small when compared to the benefits from both the CaRFG2 and CaRFG3 programs provided. Further, the anticipated indirect source emissions associated with the CaRFG2 and CaRFG3 programs are small when compared to the very significant benefits of both the CaRFG2 and CaRFG3 programs.

Table 1

Emission Benefits and Impacts of the CaRFG2 and CaRFG3 Programs

District	Emission Type	ROG (TPD)	NO_x (TPD)	CO (TPD)	SO_x (TPD)	PM₁₀ (TPD)
SCAQMD	CaRFG2 Benefits	-42	-25	-440	-10	²
	CaRFG3 Benefits	-0.2	-6.27	0	0	0
	SUBTOTAL – Benefits	-42.2	-31.27	-440	-10	0
	Impacts of Implementing CaRFG2 ¹	1.6	4.9	1.0	2.2	0.8
	Impacts of Implementing CaRFG3	.75	3.21	1.55	1.76	.61
	SUBTOTAL - Impacts	2.35	8.11	2.55	3.96	1.41
	NET CARFG2/CARFG3 IMPACTS*	-40	-23	-437	-6	1.4
BAAQMD	CaRFG2 Benefits	-26	-11	-210	-5	²
	CaRFG3 Benefits	-0.1	-3.63	0	0	0
	SUBTOTAL – Benefits	-26.1	-14.63	-210	-5	0
	Impacts of Implementing CaRFG2 ¹	-0.3	0.7	1.4	1.3	0.1
	Impacts of Implementing CaRFG3	0	0	0	0	0
	SUBTOTAL - Impacts	-0.3	0.7	1.4	1.3	0.1
	NET CARFG2/CARFG3 IMPACTS*	-26	-14	-209	-4	0.1
SJVUAPCD	CaRFG2 Benefits	-9	-6	-100	-3	²
	CaRFG3 Benefits	-0.06	-2.66	0	0	0
	SUBTOTAL – Benefits	-9.06	-8.66	-100	-3	0
	Impacts of Implementing CaRFG2 ¹	0.1	0.2	0.1	0.1	0
	Impacts of Implementing CaRFG3	0	0	0	0	0
	SUBTOTAL – Impacts	0.1	0.2	0.1	0.1	0
	NET CARFG2/CARFG3 IMPACTS*	-9	-8	-100	-3	0

¹ Includes both direct and indirect emission impacts

² It was estimated that the CaRFG2 reductions in NO_x and SO_x would significantly reduce the formation of PM₁₀.

* Total numbers were rounded off.

F. Impacts of Implementing New and Continuing District Controls

There are a number of control measures being implemented and under development by local districts that will reduce emissions from refineries and the marketing and distribution of CaRFG. These are summarized in Table 2. The combination of the control measures and the CaRFG serve to reduce emissions throughout the state.

Table 2

Examples of Refinery Related Control Measures

CONTROL MEASURES	ROG	NO_x	CO	SO_x	PM₁₀
<i>Statewide</i>					
Emission Control Strategies for Gasoline Tanker Trucks					X
Refinery Flare Emissions	X	X	X	X	X
Refinery Emissions from Leaking Components	X				
Refinery Emergency Venting Emissions	X				
<i>South Coast Air Quality Management District</i>					
Reclaim – Facility Emissions Cap		X		X	
Rule 1178 – Petroleum Storage Tanks	X				
Rule 1158 – Storage, Handling, and Transport of Coke, Coal, and Sulfur					X
<i>Bay Area Air Quality Management District</i>					
Refinery Pressure Relief Devices, Blowdown Systems, and Flares	X	X	X	X	X
Refinery Wastewater Systems	X				
Refinery Storage Tanks	X				
Marine Tank Loading of Petroleum Products	X				
<i>San Joaquin Valley Unified Air Pollution Control District</i>					
Oil and Gas Fugitives	X				
Refinery Boilers		X			